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Forest Insect Conditions
In The Northeast—1954

W. E. Waters

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FOREWORD

The Northeastern States have an outstanding record of cooperation and action against forest insects. Private timberland owners and state and federal agencies have worked together to protect our forest resources from insect depredations. This report is a compilation from many sources to show the present forest insect conditions in the region. Grateful acknowledgment is made to the many individuals and agencies who contributed to it.

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Forest Insect Conditions
In The Northeast — 1954

by

W. E. Waters[1]
Forest Entomologist

Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

FOREST INSECTS continued to be a major cause of timber loss in the Northeast in 1954. A diversity of destructive pests caused these losses in different ways: by outright killing trees; by reducing growth; by reducing merchantable volume; and by reducing the quality of forest products. Some of the insects caused serious damage to woodlands that have high recreational value.

Two long-time enemies of hardwood forests, the gypsy moth and the forest tent caterpillar, reached new peaks of infestation. The balsam woolly aphid appeared to be on the increase in Vermont and New Hampshire but declined in eastern Maine. Other major pests such as the spruce budworm, white pine weevil, beech scale, and Matsucoccus scale on red pine showed no significant change in either direction. Fortunate combinations of chemical control and natural control occurred in several instances to lessen the prospect of attack by these pests in 1955.

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[1]A member of the Experiment Station's Division of Forest Insect Research, stationed at the Forest Insect and Disease Laboratory, New Haven, Conn.

MAJOR FOREST INSECT PESTS

Spruce budworm

In northern Maine, spruce budworm populations in 1954 agreed closely with predictions based on the 1953 egg-mass survey. Natural control factors, particularly parasites, continued to be effective.

The budworm population in the Beavertail Pond--Fish River Lake infestation area decreased in 1954, with only occasional spots showing medium defoliation. North and east of Madawaska Lake, near the Canadian border, the budworm did medium to heavy feeding at many points. However, the defoliation in this area was quite variable; many stands were only lightly attacked. Elsewhere in northern Maine budworms were found at locations unnoticed before, such as the Musquacook Lakes area. In brief, although the hot spots have subsided, a light infestation now extends over a wider area in Aroostock County than in 1953.

In the Jackman area of western Maine, collections indicated a continued slow build-up of budworm populations. Budworms were at a low ebb in the rest of western and central Maine and very low in numbers in eastern Maine.

Approximately 20,000 acres of heavily infested balsam fir around Madawaska Lake were sprayed with DDT by airplane. Costs of the operation (approximately $1.70 per acre) were met by private, state, and federal funds. This included costs for detailed studies of larval development, spray assessment, and budworm mortality. The project was administered by State of Maine officials, and technical supervision was done by the Division of Forest Insect Research of the Northeastern Forest Experiment Station. The assistance of one forester each was provided by the Great Northern Paper Company and the International Paper Company. Very satisfactory control was obtained: the reduction in budworm population at six study plots averaged 99.3 percent.

In New Hampshire, Vermont, and New York, budworm populations were light to negligible. Little or no change in the population level in these states is indicated for next year.

In the province of Quebec, approximately 1,700 square miles were severely affected. There was a resurgence of the outbreak in various sections, including the St. Maurice and Lake St. John regions. The most extensive infestations are still in the Lower St. Lawrence and Gaspé regions. Over

318,000 acres were sprayed from the air with DDT by cooperative effort of the provincial government and three companies holding limits in the most severely infested areas. The control results have been reported as very satisfactory.

In New Brunswick, moderate to severe infestations of the budworm covered approximately 13,000 square miles in 1954, an increase of about 2,000 square miles over 1953. In comparison with the rate of increase over the past 5 years, this represented a decline in the rate of spread. Extension of the main outbreak was mostly to the south and west. The outbreak on Cape Breton Island increased in severity, but the infestations on the mainland of Nova Scotia and on Prince Edward Island decreased.

Nearly 1 million acres were sprayed in northern New Brunswick in 1954. As in 1953 the operation was carried out with cooperative financing by the timberland operators and the provincial and federal governments. The results were reported as generally very satisfactory.

White pine weevil

Damage by the weevil was lighter than usual in most of the New England States and in New Jersey. Perennially severe attacks occurred again in many of the extensive white pine and mixed-conifer plantings in New York. Weeviling was reported heavy in northern and north-central Pennsylvania. Despite the general fluctuations in weevil populations throughout the Northeastern States, there are always sufficient numbers of weevils to cause an appreciable amount of damage.

A total of 262 permanent survey plots are now distributed throughout nine states in the region. In 1954 nine plots were established in Maryland, so that only Delaware and West Virginia are not represented at present. These survey plots are located mostly in plantations and reforestation areas.

Balsam woolly aphid

This perennially serious pest of balsam fir was again abundant in Maine in 1954. Noticeable tree mortality has occurred there, although a decrease was noted in the severity of infestations in the eastern part of the state. Tree mortality of balsam fir in certain areas of the Green Mountain and White Mountain National Forests increased in 1954,

and further loss due to this insect is indicated for 1955. The aphid is also present in New York.

Data on damage, population trends, and other pertinent factors are obtained annually from a series of study plots on the two national forests. In addition, a study was conducted this year on the Green Mountain National Forest to develop an aerial-survey method for appraising damage by this insect. Both photographic and visual methods were tested. Analysis of the data is not yet complete, but the use of color film with estimates obtained by photo-interpretation appears to be feasible for survey purposes.

Releases of a European dipterons predator, Leucopis obscura, which is already established in Maine, were made in Vermont. Further releases are planned in Vermont and New York.

Matsucoccus scale

No new infestations of this pest were reported in 1954, although the slow spread of the present infestation in southern Connecticut undoubtedly continued. In New York, spot infestations in Westchester County and more concentrated areas in Long Island were again observed.

Natural factors, particularly low temperatures and predators, took a heavy toll of the scale. High natural mortality is probably not unusual but it is more than compensated for by a high biotic potential of the scale.

A detailed study of the bionomics of Matsucoccus has been completed and the results will be published soon.

Emphasis in 1954 was placed on insecticidal-control studies. The results of an intensive experiment conducted in Connecticut on lands of the Bridgeport Hydraulic Company showed that populations of the scale could be greatly reduced by the application of certain insecticides. However, the degree of control obtained was not great enough for practical purposes. Valuable information was obtained on the timing of applications. Of the insecticides tested in 1954, ethylene dibromide and a 2-percent oil emulsion proved fairly effective against certain stages of the insect; and Systox, a systemic poison, gave some promise of controlling all stages.

The Boyce Thompson Institute at Yonkers, New York, has begun studies to determine the effect of low temperature on the scale. This work should indicate whether northward

spread of the insect is restricted by a thermal barrier. Red pine is the only known host of Matsucoccus at present.

Forest tent caterpillar

The onslaught of the forest tent caterpillar reached a new high in New York and continued at a high level in Vermont. Infestations in New Hampshire and Maine were more restricted but included many stands with moderate to severe defoliation.

In New York the area of noticeable defoliation, mapped from the air and ground by state personnel, covered over 15 million acres. This is about double the acreage that was affected in 1953. The most extensive areas of serious infestation were in Lewis, St. Lawrence, Franklin, Clinton, and Essex Counties. The record of forest tent caterpillar defoliation in New York since 1951 is summarized in table 1.

Table 1.--Forest tent caterpillar defoliation in New York

Degree of defoliation	1951	1952	1953	1954
	Acres	Acres	Acres	Acres
Heavy	42,125	624,880	919,834	2,007,447
Moderate	33,640	965,632	1,540,711	892,928
Light	47,225	2,171,928	5,028,504	12,421,032
Total area infested	122,990	3,762,440	7,489,049	15,321,407

Source: The New York State Conservationist October-November 1954, p. 33.

In 1954 a total of 6,260 acres were sprayed in New York by airplane, using a 6-percent DDT solution at the rate of 1 gallon per acre, for control of the caterpillar on certain state lands. An additional 145 acres were sprayed with mist blower.

In Vermont the forest tent caterpillar was generally distributed throughout the state except for the north-central and northeastern sections. The gypsy moth was prevalent in the southern part of the state, also, and in many stands it was difficult to distinguish the effect of each insect. The state and the towns cooperated with private landowners in spraying a total of 27,065 acres by airplane. Of this, approximately 15,000 acres had infestations of both the forest tent caterpillar and the gypsy moth. This is a unique example of applying direct control simultaneously to

combat two highly destructive insect pests with equal effectiveness.

Gypsy moth

The highlights of gypsy moth conditions in 1954 are given in the following statement by H. L. Blaisdell, in charge, Gypsy and Brown-tail Moth Control Project, Plant Pest Control Branch, Agricultural Research Service, U. S. Department of Agriculture:

> Surveys throughout the generally infested territory in the fall of 1953 provided conclusive evidence that the acreage of defoliation in 1954 would exceed the all-time peak of nearly 1½ million acres recorded in the summer of 1953 unless infestation intensity in the outbreak areas was materially reduced by winter mortality of the eggs, natural enemies or extensive aerial spraying. Winter mortality was relatively unimportant. However, through the cooperative efforts of responsible Federal, State and local agencies, plus concerted action by an aroused public, more than 1,400,000 acres heavily infested by the gypsy moth were sprayed in the spring of 1954 and only 491,000 acres of untreated territory were defoliated by this pest. In the outbreak areas there was heavy mortality of late instar larvae and pupae by the wilt disease and the parasite Sturmia scutellata. This severe reduction in infestation intensity together with the aerial spraying of areas of high population levels by State and local agencies should reduce defoliation by the gypsy moth in 1955 to the lowest acreage recorded since 1951.
>
> Surveys conducted in 1954 within the barrier zone in southwestern Connecticut and southern New York resulted in the discovery of many gypsy moth infestations of from one to three viable egg clusters each. Few old egg clusters were located. This indicated serious infiltration of wind-borne larvae from extensive areas just east of this zone where rapid infestation build-up to epidemic proportions had occurred beginning in 1952.

A summary of the spraying operations conducted by the states and federal government in 1954 is summarized in table 2.

An outbreak of the gypsy moth was discovered in Michigan in 1954, and although it was outside this region, the

Table 2.--Summary of spraying operations for control of the gypsy moth in 1954

State	Aircraft spraying		Mist blower		Total
	Federal contract	State & other	Federal	State	
	Acres	Acres	Acres	Acres	Acres
Maine	--	27,590	2,000	--	29,590
Vermont	9,765	15,000	82	--	24,847
Massachusetts	--	977,181	--	--	977,181
Connecticut	28,000	133,822	1,456	--	163,278
Rhode Island	--	--	--	25,347	25,347
New York	53,260	33,650	832	--	87,742
Pennsylvania	6,531	--	--	100	6,631
Michigan	--	86,400	--	--	86,400
Total	97,556	1,273,643	4,370	25,447	1,401,016

Source: Gypsy and Brown-tail Moth Control Project Annual Report 1954. Plant Pest Control Branch, Agricultural Research Service, U. S. Department of Agriculture.

following information from H. L. Blaisdell concerning the infestation and action taken on it should be of interest:

> Exterminative action following discovery of an isolated gypsy moth infestation in Michigan on May 19, 1954 provides a good example of the prompt and effective cooperative action which is taken to eradicate incipient outbreaks that may be located to the west or south of the barrier zone. The survey which involved the spot examination of tree growth on 148,480 acres, including the City of Lansing, was commenced on May 25 and completed on June 5. A special session of the "Little Legislature" which convened on June 2 appropriated $150,000 to begin the eradication work. Aerial spraying under a contract arranged and financed by the Michigan Department of Agriculture, involving the spraying of 86,400 acres commenced on June 6 and was completed on June 10. This hurriedly organized but well-planned and directed program, virtually eliminated in about three weeks a well-established gypsy moth infestation in which there were numerous spots of heavy egg cluster concentrations.

Beech scale

The beech scale with its Nectria fungus complement is now distributed throughout Maine except for the northwestern

corner of the state. The beech stands in Maine have suffered heavy losses. Severe mortality of beech is also occurring in the eastern part of the White Mountain National Forest. In the White Mountains and in the Catskills in New York the scale seems to be spreading slowly. The first infestations in forest stands in Vermont were discovered this year. One is a spot infestation near Granville; the other, covering at least 20 acres, is about 50 miles southward, near Londonderry. The Nectria is already present at the latter point.

SURVEY PLANS

A watchful eye will be kept on the spruce budworm in the coming year. Although no insecticidal control is planned, there are some areas in northern Maine where populations could rise quickly to a threatening level. The budworm population in the Madawaska Lake area, which was reduced to a very low level in 1954 by airplane spraying, will be studied with special interest in 1955. The overall budworm situation in Maine will be determined as previously by ground and aerial surveys conducted cooperatively by state and federal personnel. The permanent observation points in New Hampshire, Vermont, and New York will be re-examined to confirm the trend of infestation (now epidemic) in those states.

The white pine weevil survey plots have provided a very satisfactory means of measuring relative weevil abundance in plantations throughout the region. It is hoped that additional plots can be established in stands of natural reproduction to give a more complete picture.

A survey to define the new limits of the Matsucoccus scale infestations in southern Connecticut and southeastern New York will be conducted in September and October 1955 by state and federal entomologists. Red pine plantings in northern New Jersey are also scheduled for examination. The rate of spread has fortunately been slow, but there is no assurance that this condition will continue.

The airplane has proved to be very efficient and economical for reconnaissance of the extensive forest tent caterpillar infestations in the various states. Aerial surveys have been conducted by state personnel in New York since 1951 to map the areas of light, moderate, and heavy defoliation. These will be continued in 1955. The airplane has been used similarly to advantage in Maine. Aerial survey methods should prove to be increasingly useful and economical, particularly for defoliators.

Follow-up egg-mass surveys have provided vital information on the potential area and degree of infestation of the forest tent caterpillar for the following year, and the areas that need spraying. Egg-mass surveys will be continued in New York, Vermont, New Hampshire, and Maine in 1955.

New and faster procedures, involving sequential sampling, have been developed by the Forest Insect and Disease Laboratory for forest tent caterpillar egg-mass surveys. Sequential systems were devised and used to advantage in these four states in 1954 and will be used again in 1955. This sampling method permits fast and reliable estimates of the potential class of infestation. A forest-insect-survey conference of state and federal forest entomologists was held at the Forest Insect and Disease Laboratory in New Haven in February 1955 to discuss the improvement of sequential sampling for the forest tent caterpillar and the development of sequential sampling techniques for other forest insects. Means of increasing the uniformity of survey procedures and reporting techniques in the region were discussed at this meeting.

It is hoped that during 1955 a regional forest-pest-detection program may be developed. The Divisions of Forest Insect and Forest Disease Research of the Northeastern Forest Experiment Station plan to submit to the 12 Northeastern States suggestions for such a program.

CONTROL PLANS

The major control efforts in the Northeast in 1955 will be directed against the forest tent caterpillar and the gypsy moth.

Spraying against the tent caterpillar in New York will be conducted on special State lands where control is deemed advisable. In Vermont and New Hampshire, protection of sugar bushes will be the major concern. The responsibility for these control measures rests largely with the states and private landowners.

Control of the gypsy moth in 1955 will continue with a coordinated program to prevent spread through enforcement of the quarantine, spray infestations within the barrier zone, and eradicate as promptly as possible outlying infestations.

Further insecticidal tests will be conducted for control of the Matsucoccus scale, using double or multiple applications against the summer and fall broods.

Modifications of the knapsack spraying treatment with lead arsenate to control the white pine weevil will be tested in 1955. These tests will include selective spraying, where only the best or "crop" trees are treated, and spraying in combination with wider spacing and thinning.

Table 3.--The forest insect situation in the Northeast, 1954

MAJOR FOREST INSECTS

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Spruce budworm	Balsam fir; white, red, & black spruce	Maine--Aroostook Co.	General distribution	Light-medium	None in 1955.
		New Hampshire--northern	General distribution	Very light	
		Vermont--northern	General distribution	Light	
White pine weevil	White pine, Norway spruce, & other conifers	Regionwide	General distribution	Light-heavy	Knapsack spraying with arsenate of lead in small areas. Helicopter spraying of DDT where economical.
Forest tent caterpillar	Sugar maple, poplar, & other hardwoods	New York	15,320,000 acres	Light-heavy	Airplane spraying with DDT of sugar bushes and special-use areas having heavy infestation.

(continued.)

Table 3.--(continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Forest tent caterpillar (continued)	" "	Vermont	General, except north-central & eastern sections	Medium-heavy. Apparent decline of infestation in some areas.	" "
		New Hampshire--western	Over 1,000 acres	Light-heavy. Apparent decline in most areas.	
		Maine--central & west-central	19,500 acres	Light-heavy	
Matsucoccus scale	Red pine	Connecticut--southern, near Bridgeport	Scattered over 60 square miles	Light-heavy	Destroy infested trees.
		New York--southeastern, including Long Island	Many small areas	Medium-heavy	
European pine shoot moth	Red pine & Scotch pine	Regionwide, except northern New England & New York	General distribution	Light-heavy	None.

(continued.)

Table 3.-- (continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Gypsy moth	Hardwoods, white pine, & hemlock	New England, Eastern New York	General distribution	Light-heavy	Airplane spraying with DDT. Mist-blower spraying where feasible.
		Pennsylvania-- Lackawanna Co.	6,500 acres	Possibly eliminated by spraying in 1954	
Beech scale	Beech	Maine	General distribution over 80% of State	Light-heavy. Continuing tree mortality in many areas	Sanitation-salvage cuttings where feasible.
		New Hampshire-- east-central	General distribution	Light-heavy. Increasing	
		Vermont-- central	2 spots, 1 of 20 acres	Medium-heavy. First forest infestation in Vermont	
		New York-- Catskill region	General distribution	Light-heavy. Slight increase in area	

(continued.)

Table 3.--(continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Balsam woolly aphid	Balsam fir	Maine	General distribution	Light-heavy. Decrease in eastern sections	Sanitation-salvage cuttings where feasible.
		New Hampshire--White Mt. Natl. Forest	General distribution	Light-heavy. Increasing in severity	
		Vermont--Green Mt. Natl. Forest	Central & southern districts	Light-heavy. Continuing with some tree mortality	
		New York--Adirondacks	General distribution	Light-medium	
Pit-making oak scale	Chestnut oak & white oak	Pennsylvania--entire oak region	General distribution	Light-heavy	None.
		Maryland--Hagerstown area	Scattered trees	Light	None.
Pine leaf aphid	White pine & red spruce (alternate hosts)	Southern Maine, Northern New Hampshire, Vermont, and New York	General distribution	Light-heavy	None.

(continued.)

Table 3.--(continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
European spruce sawfly	Red, white, & black spruce	Maine--northern	General distribution	Light-medium	None.
Yellow-headed spruce sawfly	Spruces	Maine--northern	General distribution	Light	None.
		New York	3 acres	Light	Spray with DDT or arsenate of lead.
Pine sawflies	All pines	Regionwide	Scattered infestations, 1-500 acres	Light-heavy	Spray with DDT.
Walkingstick	Oaks & hickories	Maryland--Allegany Co.	25 acres	Light-medium. Definite decrease from 1952 & 1953	None.
Pine spittle bug	Pines	Pennsylvania	5,000 acres, scattered in plantations	Light-medium	Spray plantations with DDT to control adults.
		Maryland--central & southern	General distribution	Light-medium	

(continued.)

Table 3.--(continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Saddled prominent	Sugar maple, beech, birch, & oaks	New York-- Rensselaer Co.	3,900 acres	Medium-heavy	Spray with DDT by airplane.
Pales weevil	Young conifers	Regionwide	Mostly in areas naturally seeded or planted after cutting	Light-heavy	Do not replant for 2-3 years after cutting. Spray seedlings with lead arsenate.
Birch leaf miner	Birch	Central New England and New York	General distribution	Light-heavy	Spray ornamental trees with Lindane.
Bronzed birch borer	Birch	Maine, New Hampshire, Vermont	General distribution	Light-decreasing	Proper forest-management practices.
Linden looper	Red oak, basswood, & other hardwoods	New York-- Cattaraugus Co.	50 acres	Medium-heavy	None.
		Vermont	General distribution	Light-decreasing	None.

(continued.)

Table 3.--(continued.)

Insect	Host	Locality of infestation	Extent	Degree of infestation	Recommended control action
Hemlock looper	Hemlock	Pennsylvania	50-100 acres	Light-decreasing	None.
		Massachusetts	50 acres	Light-decreasing	
Sugar maple borer	Sugar maple	Maine	General distribution	Light	Remove infested trees when logging; favor vigorous trees.
		Pennsylvania--northern	500-1,000 acres	Light-medium	
Arborvitae leaf miner	Northern white cedar	Maine--NW quarter	General distribution	Light-medium	None.
Ips beetles	Pine	Regionwide	Scattered spot infestations	Light	Remove high-risk trees where feasible.
Pitch pine looper	Pitch pine	Massachusetts--Cape Cod	Scattered	Heavy	Airplane spraying with DDT.

Table 4.--The forest insect situation in the Northeast, 1954

MINOR FOREST INSECTS AND SHADE TREE INSECTS

Insect	Host	Locality of infestation	Extent	Recommended control action
Matsucoccus gallicola	Pitch and Virginia pine	Pennsylvania--south & central	General distribution	None.
Pine bark aphid	White pine	Regionwide	General distribution	Spray with contact poison where feasible.
Pine twig borer (Eucosma gloriola)	White pine	New Jersey--northern	Scattered infestations	None.
Spruce gall aphids	Norway spruce & other spruces	Regionwide	General distribution	Spray Xmas trees and ornamentals with nicotine sulphate.
Bagworm	Arborvitae, red cedar, & other conifers	Delaware, Maryland--central & southern	General distribution	Spray with DDT or lead arsenate.
Spruce mite	Conifers, including cypress and hemlock	Maryland--central & southern	General distribution	Spray with effective miticide, where feasible.

(continued.)

Table 4.--(continued.)

Insect	Host	Locality of infestation	Extent	Recommended control action
Red turpentine beetle	White, red, & pitch pines	Pennsylvania--south-central	200 acres	Remove or spray infected trees with BHC.
Eastern tent caterpillar	Cherry	Regionwide	General distribution	Spray with DDT.
Spring & fall cankerworms	Hardwoods	Most states	General distribution, most noticeable on roadside trees and ornamentals	Spray with DDT in parks & roadside areas.
Satin moth	Poplars & willow	Maine, New Hampshire & Vermont	Scattered small infestations	Spray ornamentals with DDT.
Elm leaf beetle	Elm	All states	General distribution	Spray with DDT or arsenate of lead.
Locust leaf miner	Black locust	Rhode Island & Maryland	General distribution	Spray with DDT where feasible.

(continued.)

Table 4.--(continued.)

Insect	Host	Locality of infestation	Extent	Recommended control action
Locust borer	Black locust	Pennsylvania	General distribution	None.
Mimosa webworm	Mimosa & honey locust	Delaware & Maryland	General distribution	Spray with DDT or Lindane.
Fall webworm	Hardwoods	Rhode Island	General distribution	Spray with DDT.
Orange-striped oakworm	Oak	Rhode Island	General distribution	Spray with DDT.
Birch leaf skeletonizer	Birch	Maine--northern Acadia Natl. Park	General distribution	None.
Green-striped maple worm	Maple	Maine	Small, spot infestations	Spray with DDT.
Maple leaf cutter	Sugar maple	Vermont	General distribution	None.
Maple trumpet skeletonizer	Sugar maple	Vermont	General distribution	None.

(continued.)

Table 4.--(continued.)

Insect	Host	Locality of infestation	Extent	Recommended control action
Bruce's spanworm	Sugar maple	Vermont	General distribution	None.
Mountain-ash sawfly	Mountain ash	Maine--Acadia Natl. Park	General on host trees throughout Park	Spray with arsenate of lead or DDT.
Sycamore lace bug	Sycamore	Delaware & Maryland	General distribution	Spray with contact poison.
Japanese beetle	Elm, linden, & other hardwoods	Delaware & Maryland	General distribution	Spray with DDT.
Smaller European elm bark beetle	Elm	Delaware	General distribution; some tree mortality	Destroy badly infected trees, spray others with DDT.
Asiatic oak weevil	Oaks	Delaware & Maryland--central	General distribution	None.

(continued.)

Table 4.--(continued.)

Insect	Host	Locality of infestation	Extent	Recommended control action
Webworms	Sweetgum	Delaware--New Castle & Kent Counties	200 acres	None.
	Pin oak	Delaware	General distribution	None.
Woolly elm aphid	Elm	Delaware	General distribution	None.